



# 220

November 2024



## YAESU FR50B

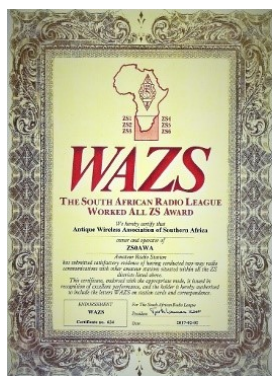
The model FR-50B communication Receiver designed for the amateur bands, is an all valve receiver providing a high degree of sensitivity, selectivity and stability. Manufactured in the 1960's.

It is a double conversion super-heterodyne receiver employing a variable oscillator for the first mixer stage, and a crystal controlled oscillator for the second mixer stage.

Adequate selectivity is provided for SSB, AM and CW with the utilization of two 4Kc mechanical filters.

When used in conjunction with the FL-50B transmitter, transceive — receiving and transmitting on the same frequency — operation is possible. This is a useful feature for SSB communication.

A built in monitor circuit enables monitoring of the station transmitted signal at any time.



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## Reflections:

How fast the year has seemed to go, well for me anyway. My unsuccessful move to the Northern Cape and back probably made it seem like that, but I am sure we are being affected by the CME's and solar storms and the days are getting shorter and fewer.

I can't remember when last I was so busy. I'm sure it was much better when I was full time employed and only had weekends to really spend time playing radio and doing all the other things that we are intended to do on weekends, like braai, watch rugby, cricket, F1, WRC and all those good things.

Now I can play radio whenever I want, not that much is happening on the bands these days, and I have joined the elite group that always say "every day is weekend". But I'm so busy in the week that I still have to look forward to weekends. We are never satisfied are we?

I love to include others in this, because I am sure I am not the only one.

Although it has been a busy year, it has also been a sad year in that we have had to say farewell to a good few of our fellow friends whose keys have gone silent. I do

believe that ham operators are probably the one breed who tend to remember those who have passed on more than any other group of people. I very often hear of hams talking about past members who made an impression on radio operators and keep their memory alive by doing so.

I have been fortunate to have had a few of the old timers leave some kind of impression on my Ham career and my life. Some of them are still full of life, while a few have gone SK. One who I will always remember is OM Rod ex ZS5RK. I think that Rod left an impression on many of the hams around. Always willing to help out and always willing to give instruction. Rod's favourite was to keep telling me that my G5RV was a compromised antenna and that I would do better with an inverted V or dipole type antenna. He only stopped telling me that, when I did finally put up an inverted V. There were of course many other aspects to Rod, one of them being the formation of the AWA.

I had a boss who always used to tell me that one must make sure that when you finally leave this earth, that you have left some-

thing behind, no matter how big or small, that will always make people remember you by.

I think that Amateur Radio gives us an opportunity to do exactly that. The field and scope is just so large and there are those who have made such technical impressions in writing software, design and developing of hardware. Manufacture of products to make it all so easy to do, like plug and play. The field is never ending. From the design and manufacture of the first tubes, to the latest microchips, hams have been involved in all of it.

We certainly are privileged to have lived in this last 50 years, to see and experience the changes that have taken place, but I wonder how many did not know that they could actively participate in it?

Participation, no matter how big or small, is the key to having an activity that you appreciate and that will give you satisfaction.

Get out there and call CQ on the bands, on your favourite mode and see the results you can achieve.

73

DE Andy ZS6ADY

## Wikipedia

### Solar Cycle:

The **solar cycle**, also known as the **solar magnetic activity cycle**, **sunspot cycle**, or **Schwabe cycle**, is a nearly periodic 11-year change in the Sun's activity measured in terms of variations in the number of observed sunspots on the Sun's surface. Over the period of a solar cycle, levels of solar radiation and ejection of solar material, the number and size of sunspots, solar flares, and coronal loops all exhibit a synchronized fluctuation from a period of minimum activity to a period of a maximum activity back to a period of minimum activity.

The magnetic field of the Sun flips during each solar cycle, with the flip occurring when the solar cycle is near its maximum. After two solar cycles, the Sun's magnetic field returns to its original state, completing what is known as a **Hale cycle**.

This cycle has been observed for centuries by changes in the Sun's appearance and by terrestrial phenomena such as aurora but was not clearly identified until 1843. Solar activity, driven by both the solar cycle and transient aperiodic processes, governs the environment of interplanetary space by creating space weather and impacting space- and ground-based technologies as well as the Earth's atmosphere and also possibly climate fluctuations on scales of centuries and longer.

## Agenda for Antique Wireless Association AGM 09 November 2024

STARTING TIME 10H30 IN THE AUDITORIUM OF THE SAIEE

- \* ATTENDANCE.
- \* APOLOGIES.
- \* OPENING BY JACQUES ZS6JPS, PRESIDENT.
- \* MEMBERSHIP FIGURES (Jacques)
- \* FINANCES. (Jacques)
- \* DONATIONS (Jacques)
- \* FEEDBACK ON QSO PARTIES
- \* NETS (RAD)
- \* MUSEUM (Louis ZS6SK)
- \* JEFF WRIGHT SK CW FLOATING TROPHY (Jacques)
- \* NEW APPOINTMENTS – VOTING
- \* OPEN DISCUSSION – FURTHER ITEMS

THANKS

CLOSING:

Andy ZS6ADY  
PRO/SEC

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### RESULTS OF THE AWA VALVE QSO PARTY

Following are the results of the AWA Valve QSO Party held on 05 and 06 October 2024

AM:

1. Ludwig Combrinck ZS5CN – Morrow MB 565
2. ZSOAWA – Yaesu FT 102

No other logs were submitted.

SSB:

1. Nico Oelofse ZS4N – Yaesu FT101
2. Theunis Potgieter ZS2EC – Kenwood TS570
3. Dave MacGregor ZR6DM – Vertex VX1700
4. Kobus Kotze ZS6KBS
5. Leon Botha ZS3LB

There were 53 stations active and 6 logs submitted.



## A Day In the Life at SAIEE

Another interesting day at the SAIEE, this one was the last for the year.

Renato had the opportunity to show and tell of the various items one could test on an oscilloscope and what the patterns look like. Although few in numbers, I think we all enjoyed this show and tell and were quite surprised at what one could do.



We then all moved out to the field where Renato had set up a field station where we planned to listen and try contact through the ISS which was due to pass over. Armed with a dual band Kenwood, dual band antenna and 4 operators, we all gathered around to see what was going to happen.

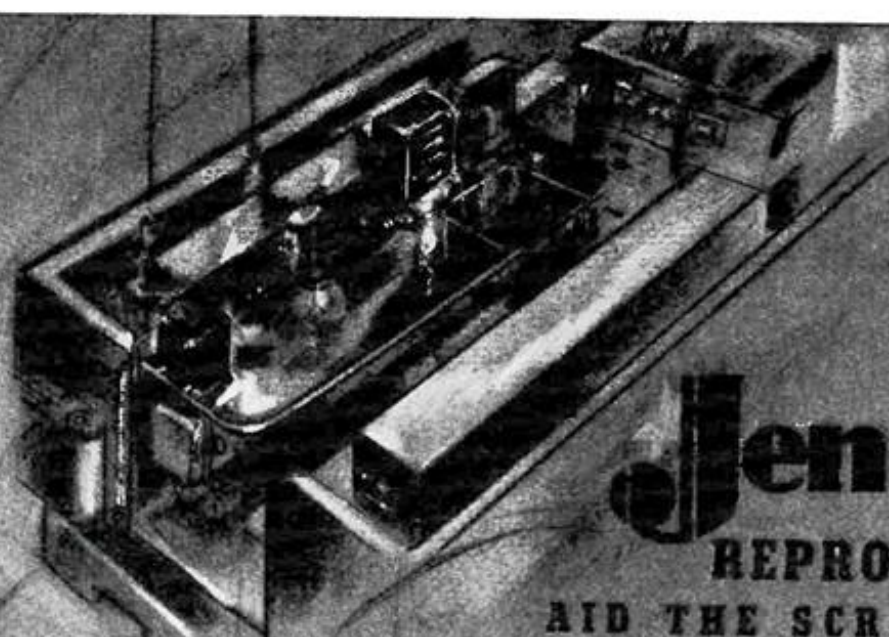


Renato had the Yagi antenna in hand and the mic of the radio, and was trying to get the doppler correct, when it all started to happen. Great excitement and the antenna was being waved all over the place while calling CQ and Wally was writing down call signs.

After wrestling the antenna out of Renato's hands, things became a bit more organised and still filled with excitement, Renato was calling them in. Contact with Mario ZS6MAR, contact with Stewart ZR1WT in George, and then a few others.

Before we knew it, the ISS had passed and all was quiet again, except Renato....





# Jensen

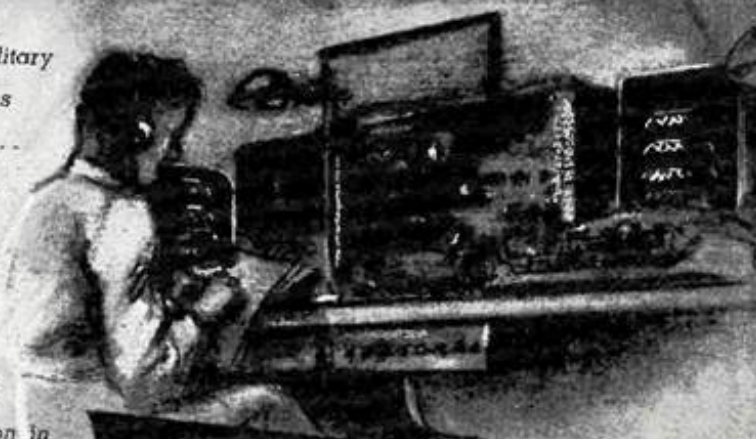
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## Homebrew Your Own Inductors!

Can't find the inductors you need for an antenna, a tuner or amplifier? Build your own—it's easy!

By Robert H. Johns, W3JIP

Air-dielectric inductors can be made quite easily at home. Some coils are held together by clear epoxy ribs, others use scrap pieces of PC board and epoxy. The larger coils are made from 1/4-inch-diameter copper tubing.

Corrections to this article appear in **October QST Feedback**.

Those favorites of do-it-yourselfers—Barker & Williamson's (B&W) Mininductor and Air Dux coil stocks—are getting harder to find. When you do locate a source, you'll find the inductors are rather expensive. Less-expensive inductors, such as those shown in the accompanying photographs, can be homemade, using epoxy for the supporting ribs. The coils have excellent Q—some even higher than those of shiny, tinned coils that are often used. [1, 2] Mounting posts to support the homemade coils on a chassis can be added as shown in **Figure 1**. I'll tell you how you can produce similar inductors, make coil forms that easily release a tightly wound coil after wrapping and how to wind the coils with uniform turn spacing.

For greater coil strength, rib-reinforcing strips made from PC board and perf-board can be used to further strengthen the inductor assembly. For these coils, I use magnet wire because the epoxy attaches firmly to the wire's plastic coating. Bare copper wire can also be used, but its bond with the epoxy is not as strong.

### Coil Forms

You'll need some forms on which to wind the coils. Such forms are readily made from inexpensive PVC pipe (see Figures 2 and 3). Slots (3/8 inch wide or more) cut into the pipe walls allow the form to collapse and release a coil after it has been wound and the epoxy ribs applied. While the coil is being made, the coil-form walls are supported by a block of wood or piece of pipe inside the form. After the epoxy sets firmly, the block is removed, the ends of the coil wire cut away from the form and the coil-form walls are pushed in to free them from the finished coil. The small holes in the form are used to secure the wire to the form at the beginning and end of the winding.

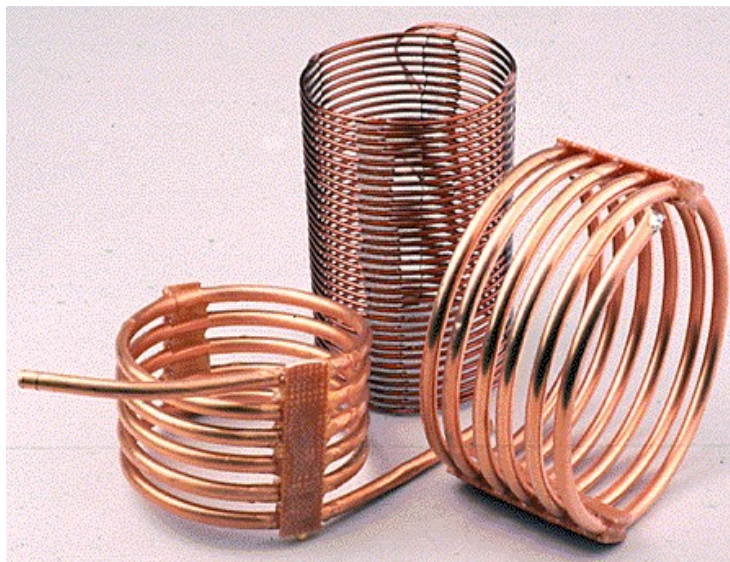
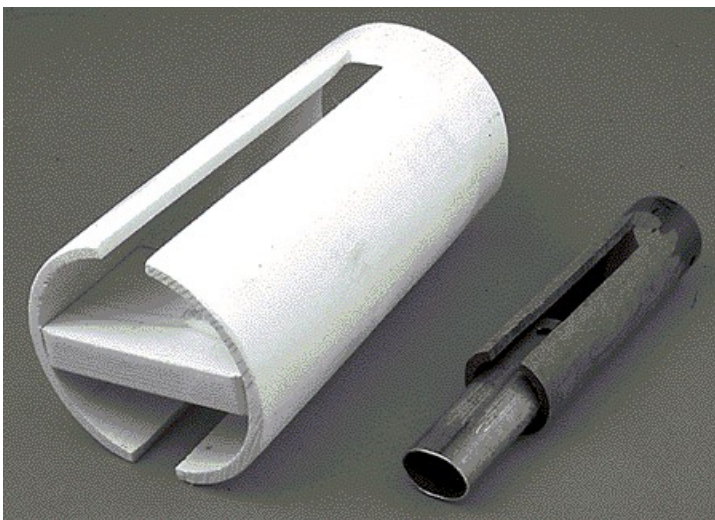


Figure 1—Mounting posts for these coils are made from flat-head nylon bolts attached to the coils with epoxy.

Figure 2—Coil-winding forms made from PVC pipe. The slots allow the sides of the cylinders to collapse to release the coil. Epoxy for the support ribs is applied to the wire turns over the slots of the forms.





**Figure 3—Drawing of a typical coil-winding form and its insert. Dimensions are dependent on the size of the coil (see Table 1). The slot width,  $t$ , should be a minimum of  $\frac{3}{8}$  inch. The text explains how to use the form's insert.**

**Table 1—Coil and Form Data**

| $t$<br>Diameter | Block Width or Pipe Size |              |         | Approx. Coil      | Coil Length | PVC Pipe Size | L | S |
|-----------------|--------------------------|--------------|---------|-------------------|-------------|---------------|---|---|
| 1.1             | 3.5                      | 3/4 Sch 80   | 5 4 0.5 | 0.5 (copper pipe) |             |               |   |   |
| 1.7             | 4                        | 1 1/4 Sch 80 | 6 5 0.5 | 1 (copper pipe)   |             |               |   |   |
| 2.4             | 5                        | 2 Sch 40     | 7 6 0.9 | 2                 |             |               |   |   |
| 3.5             | 7                        | 3 Sch 40     | 9 8 1.0 | 3                 |             |               |   |   |
| 4.5             | 7                        | 4 Sch 40     | 9 8 1.0 | 4                 |             |               |   |   |

All dimensions are in inches. The size columns refer to *pipe sizes* and not actual pipe dimensions. Schedule 40 PVC pipe is commonly available in hardware and plumbing supplies. Schedule 80 pipe has a thicker wall and is available from larger distributors. The size and schedule numbers are clearly marked on all PVC pipe. L, S and  $t$  are the dimensions referred to in **Figure 3**.

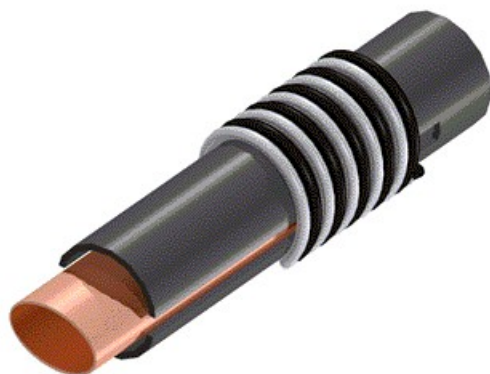
**Table 1** gives the dimensions of some of the coils and forms illustrated. These dimensions can be modified if you want to build longer coils. The width of a spacing block made from one-inch board ( $\frac{3}{4}$ -inch thick, finished) is also in the table. After a coil is wound, the tightly wound wire firmly holds the block within the coil form. Cut the spacing block to the size given in **Table 1**, then round its edges until it is a snug fit in the end of the form that *isn't* slotted. The block is removed from the coil form by tapping it out with a hammer and a dowel.

A metal tube brace—instead of a wood block—is used for the two smaller coil forms. The tube is flattened to create an *oval* inside support. A coil is wound on the form with the long diameter of the tube's ellipse holding the form sides apart. When the coil winding is finished, the tube is simply rotated a quarter turn and removed. It helps to roughen the outside of a coil form so that there is less of a tendency for the wire to slip while the coil is being wound; coarse sandpaper or a file will do the trick.

### Winding Coils

It is possible to space the coil turns as you wind them, and then even out the spacing after the coil is finished. A better approach is to wind a *spacing cord* between the wire turns. (See **Figure 4**.) Nylon monofilament line works well. Large sizes (0.065, 0.080, and 0.095-inch diameter) of this material are sold in hardware stores and departments as rotary trimmer (weed cutter) line. For wider turn spacing, use zip cord or speaker wire having two parallel conductors. Wider turn spacing improves coil efficiency; closer turn spacing increases the coil inductance. A good compromise is to space the coil turns about one wire diameter apart.

**Figure 4—Wire and a spacing line are simultaneously wound on a form. The spacing line is removed once the winding is complete. See text.**



If the wire is *tightly* wound on the coil form, a neater coil results. One way to keep the wire taut is to pass it between the jaws of a vise, with a heavy rag between the wire and the jaws. As you pull the wire through the vise jaws, it is kept taut and you can adjust the tension with the vise. Don't go overboard with this tightening—the wire needs only to stay in place while you apply the epoxy for the ribs.

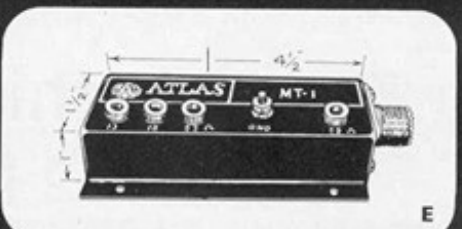
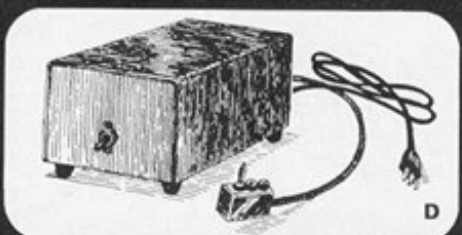
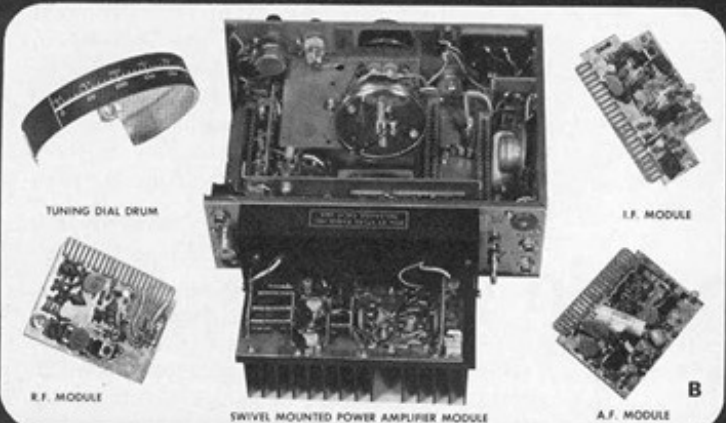
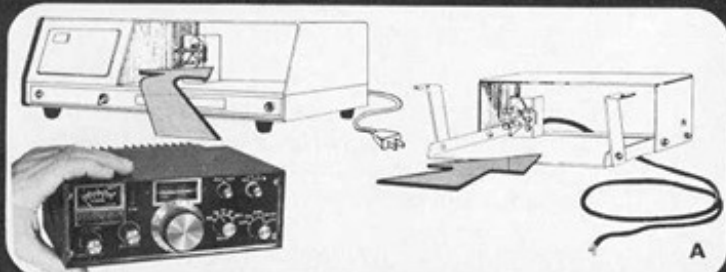
To start winding a coil, put the spacing block or tube inside the form and insert one end of the coil wire and spacing line in the side-by-side holes at one end of the form. Wind the coil by rotating the form on its axis. When you have filled the form (or made as large a coil as you need), cut off the wire supply and feed the wire end into the nearest small hole in the form. Tighten the coil ends by grasping the wire inside the form with needlenose pliers and rotating the pliers. Again, don't overtighten—the wire needs just to stay in place. Allow the spacing line to unwind and remove it from the form.

### Building Ribs

To make epoxy ribs for a coil, lay the coil on two separated strips of wood or between the jaws of a vise, so that the work surface



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doesn't interfere with the setting epoxy. An inner mold is needed so that the epoxy won't drip through the turns. For the three largest coil forms, stick a length of electrical tape to the inside of the coil, in the slot of the form. The tape will easily pull away from the epoxy after it has hardened. For the two smaller forms—where there isn't much room inside for hands to work—I use craft sticks (wooden Popsicle sticks about 3/8-inch wide) covered with electrical tape. Epoxy doesn't adhere to the nonadhesive side of the tape, either. The tape-covered sticks are supported by the tapered ends of the slots and by tape or shims at the open ends of the slots.

Use regular-setting-time epoxy (4 to 6 minutes) for coil ribs, not the quick or long-working-time epoxies. Mix only enough epoxy to make one rib at a time. Apply a bead of epoxy to the coil and let it sink to wet the coil wires. Add as much epoxy as you need, without having the epoxy spread wider than the inner mold or get onto the form. Getting this right takes a little practice. With one rib setting, after a few minutes turn the coil over to apply epoxy to the other side.

### Removing the Coil from the Form

Allow the epoxy to set thoroughly (overnight to be sure) before removing the coil from the form. Cut off the wire ends that pass through the form and pull this scrap out of the form. Remove the spacer block (or oval tube) from inside the form. Press together the ends of the two halves of the coil form. If you don't have too many epoxy spills and drips, the coil will come free of the form and be self-supporting. The slots in the coil form should extend beyond the coil so that the collapsing walls of the form will separate from the coil. That is why the holes for the coil wires are not at the ends of the slots.

If you need a sturdier coil, give it four ribs. Simply stick two more strips of electrical tape to the inside of the coil and add epoxy. I have been surprised at the strength of the epoxy ribs, because of the strength of its bond to the wire and the elasticity of the cured epoxy.

### Cutting and Connecting to the Coils

A long coil can be divided by cutting the ribs with a hacksaw. Wire turns can be removed from a coil by breaking the wire out of a rib, or by nipping off a turn or two at each rib with end cutters.

Before attaching wires to the coil, remove the wire's plastic coating. Making connection to the inductor at locations other than the ends is not difficult. First, push in the turns *on either side* of the turn you want to tap to. This gives you room to scrape off the enamel coating, wrap the connecting wire around the turn and solder it. If you possess a steady hand and a small soldering iron, you can scrape the outside diameter of a turn, tin the wire and solder a tap wire to the top of the bared turn.

### Mounting Coils

The coil-mounting posts shown in **Figure 1** are 2-inch-long, 1/4-20 flat-head nylon screws. The nylon-to-epoxy bond is not very good, but the strength of the joint results from the grip of the epoxy around the edges of the flat heads. With the flat bolt head on a rib, the applied epoxy forms a channel around the head, which traps it to the coil. The mounting posts can be attached at the same time you make the ribs, or later.

The end mounting posts are also 1/4-inch-diameter nylon bolts, with their heads cut off. To attach them to the coil, one turn near each end of the coil is pushed in, and the nylon post is threaded between this turn and the neighboring coil turns. Epoxy blobbed around this joint makes a positive grip on the post by penetrating into the screw threads. They're strong mounting posts.

### Wire Sizes

There is no given wire size that must be used for a particular coil size. For example, you can make coils on a 1.7-inch diameter form using #20 to #12 (or even larger) wire. Your application dictates the wire size and physical size of the coil.

### Large-Diameter Coils

This method of homebrewing coils can be used for making large coils by beefing up the epoxy ribs. The title photo shows a pair of coils wound from 1/4-inch-diameter, thin-wall copper tubing. This inexpensive *refrigerator tubing* is available from hardware and plumbing suppliers. A coil can be wound on any cylindrical form and then released. It retains its spiral shape by itself and can be stretched and compressed to give the desired turn spacing. Epoxy ribs are added when the coil is removed from the form.

Perfboard and PC board scrap cut into strips can be used as an inside mold for the epoxy ribs. The PC board material bonds to—and reinforces—the epoxy ribs. Roughen the board surface so that the epoxy has a greater surface area to adhere to. If additional strength is desired, add another strip to the outside of the rib. If you want a solid rib, fill the holes between coil turns with epoxy. Use strips of tape to close one end of the holes formed between the coil turns and the circuit board strips. Dribble epoxy into the rib sandwiches and fill them. Quick-setting epoxy is a help here, but it's a nuisance to work with. Fiber-filled fiber-glass resin, available from auto parts stores, can be used to build large coils, but it is too noxious for indoor use.

### Windup

With some inexpensive, readily available materials, you can make your own air-wound inductors. Not only will they look good and work well, you can say you made them yourself!

Robert H. Johns, W3JIP, is a physics teacher who was first licensed as a Novice in 1952. He originated the antenna trap design that uses coaxial cable for the trap's inductor and capacitor and dual-frequency traps with bifilar windings of XLP wire. [\* , +] More recently, Bob developed a way to homebrew 8-inch-diameter coils with very high Q. [++ ] Bob has authored many antenna articles in amateur and shortwave magazines. You can contact him at Box 662, Bryn Athyn, PA 19009.

### Notes

\*Robert H. Johns, W3JIP, "Coaxial Cable Antenna Traps," *QST*, May 1981, pp 15-17.

+Robert H. Johns, W3JIP, "Dual-Frequency Antenna Traps," *QST*, Nov 1983, pp 27-30.

++Robert H. Johns, W3JIP, "Home-Brewing Large Antenna Coils," *QST*, Oct 1992, pp 45-49.

1 Verified in the ARRL Lab.

2 Because of the skin effect, RF current flows mostly in the tin/lead coating of a tinned wire. Its resistance is significantly greater than that of copper, reducing the Q.

### Calculating Air-Core Inductors

The approximate inductance of a single-layer air-core coil may be calculated from the simplified formula:

$$L(\mu H) = \frac{d^2 n^2}{18d + 40}$$

where:

L = inductance in microhenrys,

d = coil diameter in inches (from wire center to wire center),

l = coil length in inches, and

n = number of turns.

This formula is a close approximation for coils having a length equal to or greater than 0.4 d. Inductance varies as the square of the turns. If the number of turns is doubled, the inductance is quadrupled. This relationship is inherent in the equation, but is often overlooked. For example, if you want to double the inductance, put on additional turns equal to 1.4 times the original number of turns, or 40% more turns.

Example: What is the inductance of a coil if the coil has 48 turns wound at 32 turns per inch and a diameter of 3/4 inch? In this case, d = 0.75, l = 48/32 = 1.5 and n = 48.

$$L = \frac{0.75^2 \times 48^2}{(18 \times 0.75) + (40 \times 1.5)} = \frac{1300}{74} = 18 \mu H$$

To calculate the number of turns of a single-layer coil for a required value of inductance, the formula becomes:

$$n = \frac{\sqrt{L(18d \times 40l)}}{d}$$

Example: Suppose an inductance of 10.0 μH is required. The form on which the coil is to be wound has a diameter of one inch and is long enough to accommodate a coil of 1 1/4 inches. Then d = 1.00 inch, l = 1.25 inches and L = 10.0. Substituting:

$$n = \frac{\sqrt{10.0[(18 \times 1.00) + (40 \times 1.25)]}}{1} = \sqrt{680} = 26.1 \text{ turns}$$

A 26 turn coil would be close enough in practical work. Since the coil will be 1.25 inches long, the number of turns per inch will be 26.1 / 1.25 = 20.9. The proper inductance is obtained by winding the required number of turns on the form and then adjusting the spacing between the turns to make a uniformly spaced coil 1.25 inches long.—1997 *ARRL Handbook*. (See Chapter Six of the Handbook for more information on making and calculating inductors.)

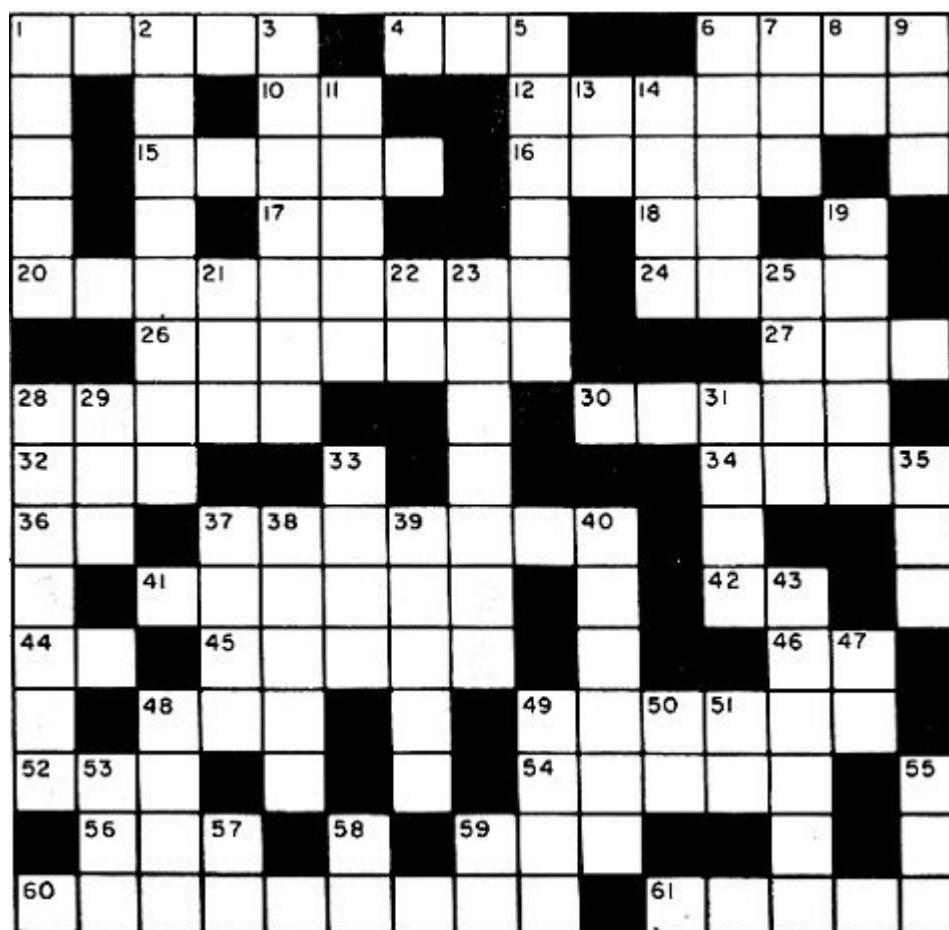
## Feedback

• Refer to "**Homebrew Your Own Inductors**," by Robert H. Johns, W3JIP, QST, Aug 1997, p 35. In the second column of the sidebar, the multiplication sign under the radical is in error; that should be a plus sign (for addition).—*Tnx Phil Isard, WF3W*

August QST: Homebrew Your Own Inductors!

ARRL 1997 QST/QEX/NCJ CD C i ht (C) 1997 b Th A i R di R I L



**Across**

1. Unit of light.
4. Color for "two."
6. Wound with a knife.
10. Response to a doctor's request.
12. Short period of time.
15. Unit of loss.
16. Batteries that power "Telstar."
17. Midwestern state (abbr.).
18. Light metal (abbr.).
20. Slipstick.
24. Hole for a speaker.
26. Oscillations.
27. Tree.
28. Some are "twice told."
30. What the satellites do.
32. It usually means trouble when components do this.
34. As opposed to the "expensive spread."
36. Schematic notation for a relay.
37. Type of battery.
41. One type of computer.
42. Printers' measure.
44. Formerly (prefix).

45. Overweight.
46. Fellow ham.
48. Athena's habitual companion.
49. Three times.
52. Greek letter used to designate "time."
54. Rare member of the heron family.
56. 23rd letter in the Greek alphabet.
59. The "cheerful month."
60. Voltage.
61. Prefix for 1/100.

25. Stir up.
28. Trig term.
29. Past.
31. Part of a skeleton.
33. Positive carrier.
35. Unit of resistance.
37. Noise on a CRT.
38. List of numbers.
39. Flux.
40. It cannot be destroyed.
43. In a liquid state.
47. Not you.
48. Expel.
49. Grayish blue.
50. This equals E.
51. A professional engineer.
53. The G.I.'s get their mail here.
55. 22nd letter of Greek alphabet.
57. That is (Latin).
58. Thing.
59. Unit of small current flow.

**Down**

1. Draws current.
2. Bone of the lower jaw.
3. Family name of the inventor of logarithms (pl.).
5. Type of antenna reflectors.
6. Type of oscillator.
7. A sailor (slang).
8. Indefinite article.
9. Unit of heat.
11. Listened to.
13. Refusal.
14. Hit with the open hand.
19. Describes solid, liquid.
21. Makes external thread.
22. Midwestern University (abbr.).
23. Capacitor failure.



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**Antique Wireless Association  
of Southern Africa****Mission Statement**

Our aim is to facilitate, generate and maintain an interest in the location, acquisition, repair and use of yesterday's radio's and associated equipment. To encourage all like minded amateurs to do the same thus ensuring the maintenance and preservation of our amateur heritage.

Membership of this group is free and by association. Join by logging in to our website.

**Notices:****Net Times and Frequencies (SAST):**

Saturday 07:00 (05:00 UTC) — Western Cape SSB Net — 7.140; Every afternoon during the week from 17:00—7.140

Saturday 08:30 (06:30 UTC) — National SSB Net — 7.125;

Echolink—ZS0AWA-L; ZS6STN-R

Sandton repeater—145.700

Kempton Park Repeater—145.6625

Relay on 10.125 and 14.135 (Try all and see what suits you)

Saturday 14:00 (12:00 UTC) — CW Net—7025; 14:20 10.115/14125

**AWASA Telegram group:**

Should you want to get on the AWA Telegram group where a lot of technical discussion takes place, send a message to Andy ZS6ADY asking to be placed on the group. This is a no-Nonsense group, only for AWA business. You must download the Telegram App first. ....+27824484368

**Suffering from Interference ?**

Jaap Lourens ZS6SAI is offering his services to amateurs around Gauteng who experience interference. Contact him on 082 086 2496. You can listen to his history on the AWA website from the net of 03 August 2024. Go to the website and look under "Net Audio Files" to find the link.

**For Sale:**

Uwe Merkle has contacted us with some radios he inherited from his Father and would like to dispose of them. His contact details are as follows:

0828479040 or [uwe.merkle@gmail.com](mailto:uwe.merkle@gmail.com)

The radio's all switch on, but he can not say if they all work. (See pics on last page)

Further to the radio's, he also has a Radiometer AM-FM Signal Generator, an Advanced Electronics Signal Generator, and an Advanced Instruments Oscilloscope.





Grundig 4010



Grundig 3050 with reel to reel on top



Huldra 4



Supersonic Suitcase Radio